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EXAMINER	
NEGIN, RUSSELL SCOTT	
ART UNIT	PAPER NUMBER
1631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPOPS.LEGAL@agilent.com

Office Action Summary	Application No.	Applicant(s)	
	10/817,244	YAKHINI ET AL.	
	Examiner	Art Unit	
	RUSSELL S. NEGIN	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-56,80-90 and 92-101* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-56,80-90 and 92-101* is/are rejected.

7)☒ Claim(s) *39,40,42,43,51-54,85,86,88 and 97-100* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Comments

Applicants' amendments and request for reconsideration in the communication filed on 17 February 2009 are acknowledged and the amendments are entered.

Claims 1-56, 80-90, and 92-101 are pending and examined in the instant Office action.

Claim Objections

The following OBJECTIONS are NEWLY applied:

Claims 39-40, 42-43, 51-54, 85-86, 88, and 97-100 are objected to because of the following informalities:

While each of claims recites "wherein a plurality of relevance scores ***are*** calculated," each objected to claim should recite "wherein a plurality of relevance scores ***is*** calculated."

Appropriate correction is required.

Withdrawn Rejections

ALL of the prior art rejections are withdrawn in view of amendments filed to the instant set of claims on 17 February 2009.

ALL of the following prior art rejections are **NEWLY applied**.

Claim Rejections - 35 USC § 101

The following rejection is reiterated:

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-56, 80-90, and 92-101 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As stated in MPEP 2106, section IV, if the claims are found to cover a judicial exception then the claims will be evaluated for providing a practical application of the judicial exception (*i.e.*, Law of Nature, Natural Phenomenon, or an Abstract Idea). This is in line with the recent decision in *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008). In the instant case, the claims are drawn to an abstract idea and therefore must be evaluated further for providing a practical application of the judicial exception. Two of the possible ways for a practical application to result are: (1) if the claimed invention physically transforms an article or physical object to a different state or thing (a physical transformation), or (2) if the claimed invention otherwise produces a concrete, tangible, and useful result. In the instant case, a physical transformation of matter is not provided, as the instant claims merely provide steps of *in silico* information manipulation. Therefore, none of said steps result in a physical transformation of matter such that the whole of the claim is statutory.

As such, the claims must be further evaluated for providing the practical application. One way to do this is for the claim to produces a concrete, tangible and useful result. The focus is not on the steps taken to achieve a particular result, but

rather the final result achieved by the claimed invention. A claim may be statutory where it recites a result that is concrete (i.e. reproducible), tangible (i.e. communicated to a user), and useful (i.e. a specific and substantial). In the instant case the steps of "displaying the gene or protein related data" **does** provide a tangible result that is useful to one skilled in the art and thus provides a practical application.

However, in addition to the facts set forth above that state that a claim must provide a practical application, the claim **must also meet** the machine-or-transformation test in order to be eligible under 35 USC 101 as statutory subject matter (*In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008). In other words, the prohibition on patenting abstract ideas has two distinct aspects: (1) when an abstract concept has no claimed practical application, it is not patentable; (2) while an abstract concept **may have a practical application,** a claim reciting an algorithm or abstract idea can state statutory subject matter only if it is embodied in, operates on, transforms, or otherwise is tied to another class of statutory subject matter under 35 U.S.C. §101 (i.e. a machine, manufacture, or composition of matter). (*Gottschalk v. Benson*, 409 U.S. 63, 175 USPQ 673, 1972), as clarified in *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008) the test for a method claim is whether the claimed method is (1) tied to a particular machine or apparatus or (2) transforms a particular article to a different state or thing.

In the instant case, the method claims are not so tied to another statutory class of invention because the **method** steps that are critical to the invention are "not tied to any **particular apparatus** or **machine**" and therefore do not meet the machine-or-

transformation test as set forth in *In re Bilski* 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008).

Response to Arguments:

Applicant's arguments filed 17 February 2009 have been fully considered but they are not persuasive. Applicant argues that the amendments to the instant set of claims overcome the rejection of record. This is not persuasive because while there is a general tie to a computer in the instant set of claims, the computer recited is not limited to be a particular machine (i.e. the computer is a general purpose "computing" machine as it is not limited to comprise any specific program or any specific structure). In the absence of a recitation of a *particular* machine, the instant rejection is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

35 U.S.C. 103 Rejection #1:

Claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. [International Journal of Cancer, volume 83, 1999, pages 318-325] in view of Reeves [genome, 2001, volume 44, pages 439-443].

Discussion of Independent claims 1 and 80:

Claim 1 is drawn to a computer-implemented method for overlaying gene- or protein-related data on chromosome maps, said method comprising:
--importing arbitrary gene- or protein-related data to a computer;
--providing an identifier, via the computer for each datum of said arbitrary gene or protein related data wherein said identifiers specify genetic loci of said arbitrary gene or protein related data, respectively;
--reading the identifiers via the computer;
--matching the identifiers, via the computer, with predefined identifiers on at least one of the chromosome maps;

--reordering the gene- or protein related data based on said matching the identifiers to an order matching the order of the predefined identifiers on said at least one of the chromosome maps; and

--displaying the arbitrary gene- or protein related data adjacent positions on the at least one chromosome map where the genes associated with the respective arbitrary gene or protein-related data are located according to said matching the identifiers with the predefined identifiers, wherein said importing, reading, matching and displaying are all automated steps.

Claim 80 is drawn to the same subject matter as instant claim 1 with the additional limitations of:

--displaying the arbitrary gene- or protein related data adjacent positions on the at least one chromosome map where the genes associated with the respective arbitrary gene- or protein-related data are located, wherein the importing, reading, matching, and displaying are all automated steps, and wherein said arbitrary gene- or protein-related data comprises a matrix of at least one microarray of gene expression data, wherein each row of the matrix is associated with a particular gene, and wherein each column of the matrix is associated with a microarray experiment, wherein a portion of the total number of columns are associated with experiments taken from normal, healthy tissue and another potion of the total number of columns are associated with experiments taken from tissue exhibiting abnormality,

--said method further comprising dividing the matrix into two smaller matrices with a first matrix containing the columns associated with normal experiments and a

second matrix containing the columns associated with abnormal experiments, and wherein said matching and displaying are performed with regard to both first and second matrices.

The article of Partridge et al. studies the location of candidate tumor suppressor gene loci at chromosomes 3p, 8p, and 9p of oral squamous cell carcinomas.

Specifically, Figure 1 on page 319 of Partridge et al. illustrates many limitations of these independent claims. The schematic demonstrates the importation of data from the Genome Data Base. The schematic also illustrates numeric identifiers, each locus indicating the location on the chromosome map, which are read into the schematic. The identifiers are then matched with predefined identifiers in each of the chromosome maps. The chromosome maps are reordered in Figure 1 so that the predefined identifiers are in the order of the gene in the chromosome map. The results are consequently displayed in Figure 1 of Partridge et al.

Furthermore, Figure 2 on page 320 of Partridge et al. indicates matrices wherein each row corresponds to a specific gene and each column corresponds to an experiment, wherein the "experimental" first set of matrices are the top three matrices and the control, normal matrix is the bottom matrix at the bottom of Figure 2 of Partridge et al.

However, Partridge et al. does not demonstrate the computer/computer display limitations of the instant set of claims.

The article of Reeves studies a computer program for the collection, analysis, and display of cytogenetic data.

Specifically, Figure 1 on page 440 of Reeves illustrates the importation and display of chromosomal data.

With regard to claims 2-3, Figure 1 of Reeves demonstrates a user interacting with image data of chromosomes during the display process. Figure 1 of Reeves also demonstrates a spatial grouping of associated genes. Furthermore, Partridge et al. also illustrates the spatial groupings of genes within the chromosome maps (see Figure 1 of Partridge et al.).

With regard to claim 4, Figure 1 of Reeves "compresses" the displayed gene data into a table (Figure 1b) wherein all of the gene data is not directly displayed.

With regard to claim 7, Figure 1 of Partridge et al. illustrates a plurality of chromosome maps. Figure 1 of Reeves maintains focus on the chromosomal areas of interest.

With regard to claim 10, Figure 1b of Reeves displays details of the selected potion of Figure 1a of Reeves.

With regard to claim 12, the external source of data in Figure 1 of Partridge et al. is the chromosome picture itself, to which the chromosomal identifiers are matched and displayed.

With regard to claims 13-14, the identifiers for the gene related data are official standard gene names, as recited in claim 14.

With regard to claim 15, the map in Figure 1 of Partridge et al. is a relational database that relates the identifiers to the predefined identifiers.

With regard to claim 16, the matrices of Figure 2 of Partridge et al. meet these limitations wherein each row corresponds to a gene and each column corresponds to a measured sample.

With regard to claim 17, there are a plurality of matrices in Figure 2 of Partridge et al.

With regard to claim 18, while Figure 1 of Partridge et al. illustrates reorderings of spatial groups, the matrices of Figure 2 of Partridge et al. meet the requirements of the remainder of the claim.

With regard to claim 19, the matrix of Figure 2 of Partridge et al. is interpreted to be a heat map.

With regard to claim 20, Figure 1 of Partridge et al. indicated the co-location values and displays the assessed co-location statistical values in Figure 2 of Partridge et al. alongside the matrices.

With regard to claim 21, the additional information in the matrices alongside the genes in Figure 2 of Partridge et al. (which correspond the chromosomal maps of Figure 1 of Partridge et al.) indicate the allelic imbalance, retention of heterozygosity, and microsatellite instability in each experiment.

With regard to claim 22-26, Figure 2 of Partridge et al. is interpreted to be a scatter plot of annotations of allelic imbalance, retention of heterozygosity, and microsatellite instability (i.e. relevance scores or gene ontologies).

With regard to claims 27-28, the matrices in Figure 2 of Partridge et al. are imported from a plurality of experiments and are on a single display.

With regard to claim 29, the additional information includes annotations in Figures 1 and 2 of Partridge et al.

With regard to claim 30, the rows tin the matrices of Figure 2 of Partridge et al. comprises row vectors the cluster data (in this instance interpreted to be candidate

tumour suppressor gene regions) is displayed alongside of the matrices as vertical black bars.

With regard to claim 31, the data in Figure 2 of Partridge et al. is interpreted to be a heat map displayed as clusters with color coding.

With regard to claims 32-33, the cluster data is interpreted to be the black bars alongside the matrices (claim 32) or the colors of the data inside the matrices (claim 33) if Figure 2 of Partridge et al.

With regard to claim 34, Figure 2 of Partridge et al. is interpreted as two separate sets of matrices. While the bottom matrix corresponds to use of controls (i.e. normal tissue), the top set of matrices in Figure 2 of Partridge et al. is interpreted to be the experimental (i.e. abnormal tissue) set of matrices. In both sets of matrices, the rows correspond to genes and the columns correspond to experiments.

With regard to claim 35, the matrices in Figure 2 of Partridge et al. are interpreted to be heat maps.

With regard to claim 36, relevance scores appear in the four rightmost columns of the matrices in Figure 2 of Partridge et al.

With regard to claim 37, Figure 2 on page 320 of Partridge et al. is interpreted to be the user interface.

With regard to claim 40, a form of cluster analysis "scoring" for tumor suppressor gene regions appear in the rightmost column of the matrices in Figure 2 as black, color coded bars.

With regard to claim 55, the additional information of candidate tumour gene suppressor regions is selected and displayed alongside the side of the matrices in Figure 2 of Partridge et al.

With regard to claim 56, the additional information comprises annotations in Figure 2 of Partridge et al.

With regard to claim 81, Figure 2 of Partridge et al. is interpreted to be a heat map.

With regard to claim 82, relevance scores for each row of each matrix in Figure 2 of Partridge et al. are displayed in the three left-most columns of Figure 2 of Partridge et al. and are comparable between the bottom matrix of controls and the row of interest in the top three matrices.

With regard to claim 83, Figure 1 of Reeves provides an interactive user interface.

With regard to claim 86, the relevance scores are in color as part of the heat map of Figure 2 of Partridge et al.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al. by use of the computation importation and display of Reeves wherein the motivation would have been that automation facilitates the analysis of chromosomes [see abstract of Reeves et al.]

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

35 U.S.C. 103 Rejection #2:

Claims 5, 6, 8, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves as applied to claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 above in further view of Koleszar et al. [US Patent 6,519,583; issued 11 February 2003; filed 27 July 1999].

Claim 5-6, 8, 9 and 11 are dependent from claim 1 with the additional features of displaying the genetic data is a specific means wherein each claim identifies a separate feature used to display the data.

Partridge et al. and Reeves make obvious the computer-implemented methods for overlaying gene related data on chromosomal maps, as discussed above.

Partridge et al. and Reeves do not explicitly state that every step corresponding to the instant claims with regard to the required display techniques.

The invention of Koleszar et al., entitled, "Graphical viewer for biomolecular sequence data," states in the abstract:

> Disclosed are methods, media and systems for graphically displaying computer-based biomolecular sequence information. Generally, biomolecular sequence information may be graphically depicted in a variety of different forms in accordance with the present invention. The sequence information may be composed of nucleotide or amino acid sequence information or both. The graphical depictions may be in several different formats providing different information relating to the sequences, and may be displayed in one or more screens of a computer user interface.

Figure 4A has the ability to zoom in on regions or zooming out and compressing regions of the genomic sequence of interest as is illustrated on the toolbar of the schematic with pop-up buttons to control the viewing of the features.

The purpose of Koleszar et al. in explained in column 2, lines 5-9, which states:

> Accordingly, the development if a display tool which allows a user to clearly and effectively display gene loci information for a given organism or organisms and/or other biomolecular sequences in desirable.

Consequently, Koleszar et al. describes a user friendly, convenient, and effective display of gene loci information.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al. and the computation importation and display of Reeves by use of the display techniques of Koleszar et al. wherein the motivation would have been that Koleszar et al. has the advantage of displaying the genomic data in a more convenient and user-friendly format [see, for example, column 2, lines 5-9 of Koleszar et al.].

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of Koleszar et al. is maintained from the previous Office action, its role is limited to specific display properties of the chromosomal maps.

35 U.S.C. 103 Rejection #3:

Claims 38, 43, 84, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves as applied to claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 above, and further in view of McCully [US Patent 4,383,994 issued 17 May 1983; filed 19 January 1982].

Claims 38 and 84 are further limiting comprising a "p value."

Claims 43 and 89 are further limiting comprising a relevance score limit value used as a cutoff for values to display.

Partridge et al. and Reeves make obvious an automated method for mapping genetic information, as discussed above.

Partridge et al. and Reeves do not use a p-value and a cutoff value.

The invention of McCully studies the therapeutic effects of salts as anti-neoplastic agents.

Specifically, example 7 in columns 8-9 of the invention uses a statistical technique to evaluate the effectiveness of the salts in malignancies in mice. Line 60-65 of column 8 of McCully state that the p values can be used to calculate differences between control and experimental samples in mice. This p value acts as a statistical cut off for determining deviation between a control and experimental sample.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al. and the computation importation and display of Reeves by use of the statistical criteria of McCully because it is obvious to use a known technique to improve a similar method. In this instance, the use of the statistical criteria of McCully to analyze the arrays of Partridge et al. would have resulted in improved and more advanced statistical analysis. There would have been a reasonable expectation of success in combining these sources because the statistical techniques of McCully are generally applicable to the analysis of the other references.

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of McCully is maintained from the previous Office action, there are no arguments to this reference in the Remarks.

35 U.S.C. 103 Rejection #4:

Claims 39, 42, 85 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves as applied to claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 above, and further in view of Ben-Dor et al. [Genome Research, 2000, volume 10, pages 365-378].

Claims 39, 42, 85 and 88 recite either use of line maps or defining relevance density scores based on distances between genetic locations (and then filtering data using these scores).

Partridge et al. and Reeves make obvious an automated method for mapping genetic information, as discussed above.

Partridge et al. and Reeves do not study line maps or density scores.

The article of Ben-Dor et al. studies radiation hybrid ordering.

Specifically, Figure 6 illustrates line maps indicating scores and distances between the relevant markers.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al. and the computation importation and display of Reeves by use of

chromosomal mapping techniques of Ben-Dor et al. because it is obvious to substitute known elements in the prior art to yield a predictable result. In this instance, the line maps and the densities of Ben-Dor et al. are an alternate means of analyzing the mappings of chromosomes. There would have been a reasonable expectation of combining Partridge et al. and Reeves with Ben-Dor et al. because they all pertain to analogous subject matter of chromosomal mapping.

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of Ben-Dor et al. is maintained from the previous Office action, its role is limited to specific display properties of the line maps and densities.

35 U.S.C. 103 Rejection #5:

Claims 41 and 87 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves as applied to claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 above, and further in view of Bodzin et al. [US PGPUB 2003/0139886 A1 published 24 July 2003; filed 5 September 2002]

Claims 41 and 87 are further limiting wherein the scores are calculated and displayed in a binary code.

Partridge et al. and Reeves make obvious an automated method for mapping genetic information, as discussed above.

Partridge et al. and Reeves do not study binary code.

Bodzin et al. teaches a method and apparatus for normalization and deconvolution of assay data.

Figure 15 of Bodzin et al. illustrates the comparison of data between control and experiment data.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al. and the computation importation and display of Reeves by use of the binary analysis in Bodzin et al. wherein the motivation would have been that the use of controls in microarrays in the form of binary data provides a convenient means of normalization of the instant set of data [see paragraph 0037 and Figure 15 of Bodzin et al.]

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of Bodzin et al. is maintained from the previous Office action, there are no arguments to this reference in the Remarks.

35 U.S.C. 103 Rejection #6:

Claims 44, 46-47, 90 and 92-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves as applied to claims 1-4, 7, 10, 12-37, 40, 55, 56, 80-83, and 86 above, and further in view of Pollack et al. [Nature Genetics, volume 23, 1999, pages 41-46].

Claims 44 and 90 are further limiting wherein matching chromosomal copy abnormality data with the gene related data identifiers and displaying this data along side the gene-related data.

Claims 46-47 and 92-93 are further limiting wherein the chromosomal copy number information is interlaced and the chromosomal copy number is displayed in color on heat maps.

Partridge et al. and Reeves make obvious an automated method for mapping genetic information using heat maps, as discussed above.

Partridge et al. and Reeves do not teach displaying of the chromosomal copy numbers on or alongside the gene related data.

The article of Pollack et al. studies genome-wide analysis of DNA copy-number changes using cDNA microarrays.

Specifically, Figure 5a on page 44 of Pollack et al. illustrates a color coded heat map (red and green) for determining the genetic states of normal vs. diseased breast cancer samples.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the chromosomal mapping techniques of Partridge et al., the display method of Reeves, by use of the color coded heat map plots of Pollack et al.

wherein the motivation would have been that the use of such plots allow more conveniently acquired and well resolved data [see lines 13-17 of abstract on page 41 and Figure 5a of Pollack et al.]

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of Pollack et al. is maintained from the previous Office action, there are no arguments to this reference in the Remarks.

35 U.S.C. 103 Rejection #7:

Claims 48 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Partridge et al. in view of Reeves in view of Pollack et al. as applied to claims 1-4, 7, 10, 12-37, 40, 44, 46-47, 55, 56, 80-83, 86, 90 and 92-93 above, and further in view of Ben-Dor et al.

Claims 48 and 94 recite either use of line maps.

Partridge et al., Reeves, and Pollack et al. make obvious an automated method for mapping genetic information, as discussed above.

Partridge et al., Reeves, and Polack et al. do not study line maps or density scores.

The article of Ben-Dor et al. studies radiation hybrid ordering.

Specifically, Figure 6 illustrates line maps indicating scores and distances between the relevant markers.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the chromosomal ordering maps and matrices of Partridge et al., the computation importation and display of Reeves, and the chromosomal copy analysis of Pollack et al. by use of chromosomal mapping techniques of Ben-Dor et al. because it is obvious to substitute known elements in the prior art to yield a predictable result. In this instance, the line maps and the densities of Ben-Dor et al. are an alternate means of analyzing the mappings of chromosomes. There would have been a reasonable expectation of combining Partridge et al., Reeves, and Pollack et al. with Ben-Dor et al. because they all pertain to analogous subject matter of chromosomal mapping.

Response to Arguments:

Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

It is noted that even though the reference of Pollack et al. is maintained from the previous Office action, there are no arguments to this reference in the Remarks. It is noted that even though the reference of Ben-Dor et al. is maintained from the previous Office action, its role is limited to specific display properties of the line maps.

Conclusion

No claim is allowed.

Claims 45, 49-54, and 95-101 are free of the prior art because the prior art does not teach or suggest the mathematical technique of dividing a matrix into four separate matrices based on control and experimental data and their chromosomal copy numbers.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Marjorie Moran, Supervisory Patent Examiner, can be reached at (571) 272-0720.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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2 May 2009

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